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15. Supplementary Notes

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16. Abstract (MAXIMUM 200 WORDS)

This report provides a comprehensive summary of the Coast Guard oil spill response R&D program undertaken during the period 1990 through 2001 following the EXXON VALDEZ oil spill and in response to the R&D provisions of OPA 90. During this period, the Coast Guard R&D efforts addressed four main focus areas: Spill Response Planning and Management, Spill Detection and Surveillance, Vessel Salvage and On-Board Containment, and Spilled Oil Cleanup and Countermeasures. The specific projects undertaken in each focus area are described, and the longer-term benefits of these projects in enhancing Coast Guard response capability are summarized. Coast Guard R&D contributions in developing oil spill R&D infrastructure, supporting oil spill technology research at universities, and facilitating technology transfer and promoting public awareness are also discussed. In addition, "representative quantitative estimates" are calculated for the potential cost savings that resulted from advances in specific technology focus areas to show the relative "return on investment" for the program.

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Executive Summary

The Coast Guard R&D Program has made significant progress over the past decade in addressing the various technological needs to enhance Coast Guard oil spill response capability and further the development of systems and equipment that can be used by the Coast Guard, other oil spill response agencies and private industry. This concerted R&D effort was undertaken following the EXXON VALDEZ oil spill, and in response to the R&D provisions in Title VII of the Oil Pollution Act of 1990. The purpose of this document is to summarize the accomplishments and benefits of the program, and assess the future potential impact of these accomplishments and benefits on the Coast Guard and the nation at large.

Accomplishments are summarized in each of four key technology focus areas: Spill Response Planning and Management, Spill Detection and Surveillance, Vessel Salvage and On-Board Containment, and Spilled Oil Cleanup and Alternative Countermeasures. Accomplishments in Spill Response Planning and Management include the development of computer-based decision tools to facilitate contingency planning and response management, and the development of computer-based systems to enhance the Coast Guard's oil spill training and preparedness evaluation program. Accomplishments in Oil Spill Detection and Surveillance include development, testing and evaluation of oil spill remote sensing systems, such as synthetic aperture radar, infrared sensors, a laser fluorosensor and a frequency scanning radiometer. These systems were evaluated in the laboratory and tested under field conditions to define performance characteristics.

In the area of Vessel Salvage and On-Board Containment, technology assessment studies were undertaken to assess the effectiveness of double-hull tankers and barges in preventing spills, assess the capability of remote sensing systems and AUVs in determining tanker damage and stability, assess the technical feasibility and operational advisability of tanker self-help countermeasures, and determine the feasibility of upgrading the Coast Guard's tanker offloading capability. Accomplishments in Spilled Oil Cleanup and Alternative Countermeasures include the development of an integrated oil spill mechanical recovery system for Coast Guard buoy tenders, an assessment of systems and techniques for recovering oil in fast-current environments, and the further development of in-situ burning as a response countermeasure, including both the testing of fire-resistant booms and the development of tactics and decision tools to support the implementation of in-situ burning in the field. Coast Guard R&D contributions in developing oil spill R&D infrastructure, supporting oil spill technology research at universities, and facilitating technology transfer and promoting public awareness are also discussed.

Finally, program history and funding levels over the period 1990-2001 are summarized, and "representative quantitative estimates" of the potential cost savings that may result from advances in specific technology focus areas are presented to show the relative "return on investment" for the program. These representative cost savings estimates show that a return of up to 1 to 2 billion dollars may be realized subject to the number and nature of future spills. This is a substantial return on investment given the investment of approximately $20 Million over the past decade. The challenge for the future lies in sustaining the program during a period when the threat of oil pollution is less visible in the national agenda, to maintain momentum and preserve oil spill technical expertise within Coast Guard R&D.